Note on the Protection of Oil Tanks from Lightning Stroke. By B. Howard Rand, M.D.

(*Read before the American Philsophical Society, January* 7, 1881.)

The frequency of the ignitions of the contents of tanks used for storing mineral oil, with the concomitant destruction of property and life has attracted much attention. The suggestions as to the means of prevention have been crude.

It is my purpose to offer a theory as to the cause, and a means of avoiding the mischief.

An air-tight tank of metal, or one sheathed with metal, would, if filled with crude rock-oil, or even with loose gunpowder, be safe from damage from lightning stroke. It would be no more in danger of the thunderbolt than a log-cabin similarly situated. If struck it would escape unharmed. The late Professor Clerk Maxwell suggested the protection of powder-magazines by sheathing them with metal. Professor Tait recommends the investigator of the so-called ball or globe-lightning to wear a suit of light copper armor. It would be safer to add a thorough ground connection. This could be made in most cases to the pipes.

As the level of the oil in the tanks must vary with the rate of the inflow and outflow through the pipes, openings are necessary to allow the egress or ingress of air. There may be occasion to lift the lid at times.

From the necessary openings and leaks around the lids, the light hydrocarbon vapours escape. These mingling with the air form an explosive mixture like the fire-damp of mines, which, if ignited at a distance of even hundreds of feet, will travel back and set fire to the contents of the tank.

To prevent this I suggest that the necessary vent-holes be protected with safety tubes after the plan of Hemming's, or with several layers of fine wire gauze, strong enough to resist any probable breaking by mechanical shock. These should be protected from dust and wet by loosely fitting covers.

On the approach of a thunder-storm, the outflow should be checked, so as to avoid an indraught, which we so well know will render useless in many cases the protecting metallic mesh.

Where moveable covers are used, they should have the ordinary seal used in telescopic gas-holders. Glycerine in the seal is recommended as it does not evaporate and is not affected by changes of temperature within the limits of ordinary atmospheric fluctuations.

Where it is necessary to introduce chemical agents in the process of refining, the well known safety traps should be used.